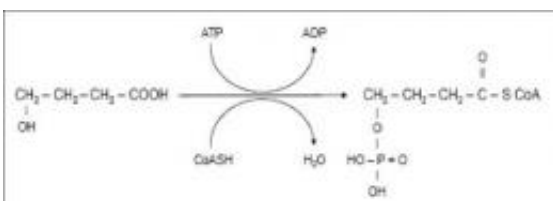


Researchers Begin to Decipher Metabolism of Sexual Assault Drug

November 19 2009, By Jennifer Donovan



Initial steps in metabolism of 4-HB.

(PhysOrg.com) -- It's a naturally occurring brain chemical with an unwieldy name: 4-hydroxybutyrate (4-HB). Taken by mouth, it can be abused or used as a date-rape drug.

Now, a team of Ohio and Michigan scientists have determined new routes by which 4-HB is metabolized by the body. "This is new and important information," said K. Michael Gibson, professor and chair of biological sciences at Michigan Technological University and a member of the research team. "It may provide new clues on how to counteract the drug's effects, or to enhance its metabolism and decrease toxicity for chronic abusers or victims of sexual assault."

Gibson is co-author with Guo-Fang Zhang and others in the laboratory of Prof. Henri Brunengraber from the Department of Nutrition at Case Western Reserve University School of Medicine of a paper published online today by the [Journal of Biological Chemistry](#). Their findings will

appear in as “paper of the week” in the the print edition of the weekly journal on Nov. 27, 2009. The journal is published by the American Society of Biochemistry and Molecular Biology.

4-HB is a derivative of a major brain [neurotransmitter](#) in humans and other species. . It occurs naturally in small amounts in the brains of most animals and humans. In a rare genetic metabolic disorder, 4-HB accumulates in extremely high levels, causing significant developmental delays and seizures.

But 4-HB—also called gamma hydroxybutyrate or GHB—is best known and most feared when it is taken orally, because it is a drug that impairs the capacity to exercise judgment, like rohypnol and ketamine hydrochloride. For that reason, it can be used to facilitate acquaintance sexual assault, commonly called date rape.

Analyzing the chemicals produced by the breakdown of 4-HB in mice and rats, Zhang, Gibson and colleagues used very sophisticated [mass spectrometry](#) approaches to identify previously unknown enzymes and pathways that appear to act on 4-HB and other similarly structured compounds. They discovered that 4-HB is metabolized by two different chemical mechanisms or pathways. Their discovery of those pathways should open the door for future studies that can identify the enzymes involved in the following steps of the breakdown of 4-HB.

“This work may help to develop new antidotes and treatments for people who have ingested 4-HB, as well as treatment for children with the rare genetic disorder that causes the compound to accumulate in high levels,” Gibson said. (For more information on genetic disorders of 4-HB, see www.pndassoc.org).

The 4-HB research was supported by the National Institutes of Health and the Cleveland Mt. Sinai Health Care Foundation.

Provided by Michigan Technological University ([news](#) : [web](#))

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